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ABSTRACT

Children and adults with hearing or visual impairments, physical impairments, learning and behavioral disorders, superior intellectual functioning, and limited intellectual potential can all benefit from technological education which includes industrial arts and related vocational subjects. This guide aims to assist technology educators in preparing instructional activities that are responsive to the unique characteristics of learners with special needs. It provides an understanding of special needs learners and their unique learning/behavioral characteristics. Topics covered include: identification of special needs learners, the importance of technological literacy for these learners, their diverse learning styles, contributions of technology education to human development, adaptation of instructional practices, to special needs youth, vocational evaluation/assessment, and identification and use of resources to facilitate instruction. Appendices include a list of organizational resources and a list of technology education standards relating to special needs. (JDD)

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Special Needs Guide for Technology Education

James J. Buffer, Jr.
and Michael L. Scott

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Introduction

Historically, technology education teachers have been responsive in meeting the unique needs of special needs learners. Children and adults with hearing, visual, and physical impairments; learning and behavioral disorders; superior intellectual functioning (gifted and talented); and those with limited intellectual potential (slow and retarded) have all benefitted from technological education including instructional programs in industrial arts and related vocational subjects. As the content base for technology education becomes more complex, technology educators need information and supportive services to assist them in preparing effective delivery systems to provide quality instructional programs for all learners, especially those with unique learning needs. With the advent of recent legislation, increased social awareness and interest in serving handicapped leaders in technology education including legal responsibilities have prompted the development of new and expanded services for special needs populations.

Unfortunately, preservice and inservice teacher preparation in technology education has not adequately addressed the development of instructional activities and methodology to be responsive to the unique needs of special learners. The mainstreaming of more and more special needs learners into technology education classes and the provision of specialized instructional services in self-contained classes require that technology education teachers possess skills typically acquired by professionals in the area of special education. Thus, this monograph was prepared to provide some supplemental information that will assist technology educators in preparing instructional activities that are responsive to the unique needs of learners with special needs.

It is of paramount importance that all students, including those with unique learning needs, have opportunities to benefit from technology education. The information in this monograph should provide the reader with a general understanding of special needs learners and their unique learning/behavioral characteristics. Additionally, information regarding learning styles, related instructional methods, and curriculum considerations that enhance the development of special needs learners in technology education classes are addressed.

Included is a revision of the *Special Needs Guide for Industrial Arts Programs* (Buffer & Scott, 1981) that originally appeared as a supplement to the *Standards for Industrial Arts Programs* publication (Dugger et al., 1981). Since the development of the original "Standards" and "Guide," the profession has experienced dramatic changes in curriculum orientation and emphasis. Technological developments and inventions have created new consumer products and services, and an array of innovative production materials, tools, and processes that have all contributed to a transition to technology-based instructional programs. This monograph is intended to bridge that transition. The monograph is not intended to replace formal teacher preparation in the area of exceptionality but to supplement the professional development needs of teachers, teacher educators, and supervisors who are interested in modifying current practices to better serve special needs learners. It should be useful for those participating in inservice workshops, professional meetings, or preservice teacher preparation.

Who Are Special Needs Learners?

All children are *special*, however, some have more need for specialized education because of their unique social, cognitive, or neuromuscular functioning. These include children who are handicapped, disadvantaged, or gifted and talented. Educational methods and procedures, instructional programs and materials, and school facilities must be modified for the purpose of individualizing programs and instruction to ensure that all children will develop to their fullest potential.

Federal legislation has provided the impetus to modify existing educational practices for special needs learners. Such legislation is reflected in Public Law 94-142, the Education for All Handicapped Children Act of 1975; Public Law 94-482, the Vocational Educational Amendments of 1976 (including reauthorizations in the Carl D. Perkins Vocational Education Act of 1984, Public Law 98-524); and Sections 503 and 504 of the Rehabilitation Act of 1973. All of these emphasize the need to identify and infuse instructional strategies and techniques to meet the challenge of providing viable educational programs for special needs persons. Further, the legislation mandates public education provide instructional programs that are the least restrictive educational alternative for handicapped students.

Congressional action on behalf of special populations has been influenced by such factors as:

1. Extremely high unemployment rates among out-of-school youth and adults from special needs groups.
2. Under-utilization of the work force through both discriminatory hiring practices and underemployment.
3. Occupational stereotyping with regard to the types of occupations for which special populations should receive training.
4. Lack of appropriate technology education instruction and vocational training opportunities for students with special needs.
5. Inadequate preparation of professional staff to provide appropriate technology education and vocational education opportunities for learners with special needs.
6. The transition from school to work by special needs populations.

The issue of providing specialized instructional programs for gifted and talented students has not been addressed in the recent federal legislation regarding special needs populations. However, educators have recognized the need to improve educational opportunities that enable mentally superior children to develop their intellectual potential. Therefore, the authors have chosen to include them in this guide under the term "special needs." We must guide these students to become our future technology educators and take positions of leadership as an enlightened group of technologically literate citizens.

The Exceptional Learner

The term "exceptional" is broader than the terms "special needs" or "handicapped." The definition of "handicapped" is derived from the guidelines of P.L. 94-142, The Education for All Handicapped Children's Act (1975) and includes those learners with behavioral, sensory, or physical disabilities. The legislative impetus for the term "special needs" comes primarily from the Vocational Amendments of 1976 (including reauthorizations in the 1984 Carl Perkins Act) and includes

those learners who are traditionally underrepresented in vocational education including the handicapped and disadvantaged.

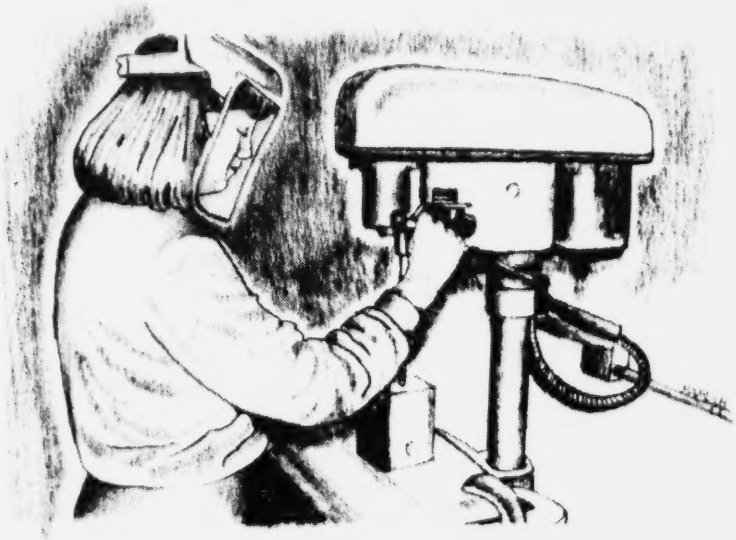
Exceptional learners, by virtue of their unique needs, interests, and capabilities, deviate notably from those behaviors exhibited by "normal learners." Consequently this term may be applied to the mentally gifted or retarded, neurologically or psychologically handicapped, or socially and economically deprived. According to Heward and Orlansky (1984), "exceptional" is an inclusive term referring to high or low functioning learners who deviate from the norm to such an extent that special education programming is needed. They further differentiate between the terms "handicap" and "disability" in the following:

> Handicap refers to the problems and difficulties a person encounters because a physical disability or behavioral characteristics marks him or her as different from other individuals. Handicapped is a more restrictive term than exceptional and does not include the gifted . . . disability is a physical problem that limits a person's ability to perform certain tasks that most other people can perform . . . a disabled person is not handicapped . . . unless that physical problem leads to educational, social, vocational, or other difficulties. (pp. 4)

Of the over 4,000,000 children who received special education services in 1981 and 1982, approximately 900,000 of those received services in gifted and talented programs (Mitchell, 1981, pp. 6-7). Further, major findings of a survey of special education in the U.S. by the Comptroller General yield data substantiating the fact that most exceptional learners, who are potentially served in technology education programs, fall under the category of "mildly handicapped." The results of the study show that:

- The "typical" child participating in special education in the public schools is 12 years old, male, and mildly handicapped.
- Twice as many males as females receive special education.
- Of the children served, 13% have severe handicaps, 36% have moderately severe handicaps, and the majority, at 51% have mild handicaps.

While technology education teachers should be aware of all areas of exceptionality, one can easily discern that the majority of students who are mainstreamed into technology education classes are mildly handicapped. Of these, the largest percentage will probably be learning disabled/behavior disordered, followed by speech impaired and mildly retarded (developmentally handicapped).



Identifying Special Needs Learners

What Technology Education Professionals Need to Know

Technology education professionals need not be concerned with mastering the skills necessary to conduct the multifactored assessment process for identifying special needs learners. That is the primary responsibility of administrators, psychologists, and professional support staff of local education agencies. However, technology education professionals should become familiar with some general characteristics of learners who are identified as "special needs" in order that they might better plan appropriate educational learning experiences.

Technology education professionals should realize that "special needs" is an inclusive term that describes students with unique characteristics that may impede their ability to develop to their maximum potential in regular school programs. Generally, a broad understanding of the unique learning characteristics of children who are handicapped, disadvantaged, or gifted/talented is helpful to technology education personnel as they design and/or modify technology education programs for special needs learners.

Learning Characteristics

Disadvantaged

Disadvantaged students have academic or economic disadvantages which impede their ability to function in regular technology education programs. These students typically may be members of families with low incomes, low or underachievers, or culturally or linguistically isolated (e.g., unfamiliar with American customs or the English language). Generally, disadvantaged children are of normal or above average intelligence but fail to achieve in the regular school environment.

Academically disadvantaged students often display language difficulties, reading or writing problems, severe computational difficulties, or other general learning problems. These students may be frequently absent from school, have a short attention span, and display low motivation when in class. They are often self-conscious and easily discouraged, have low self-concepts, and express feelings of isolation.

Economically disadvantaged students typically are members of families whose incomes are below the national poverty level, or their parents are unemployed or are recipients of public assistance. Generally, these students exhibit many of the same behaviors as academically disadvantaged students.

Gifted and Talented

Gifted and talented students are those who, by virtue of outstanding abilities, are capable of exceptionally high performance academically, physically, or creatively. However, these students will not live up to their full potential unless challenged in the instructional environment. Teachers should not assume that gifted children will take care of themselves because of their superior intelligence. The gifted also have unique needs and, as a result, require enriched and challenging activities guided by a caring and stimulating teacher. In fact, unless they are challenged, their talent and creativity may be directed toward disruptive behavior.

Handicapped

Handicapped students are learners who have specific or general handicapping conditions that may interfere with their functioning in a regular school environment. These handicaps may be sensory, physical, emotional, or any combination of the three. There are several terms used to classify students with handicapping conditions. Among these are the mentally retarded, hearing impaired, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, deaf-blind, multi-handicapped, learning disabled, and other health impaired. Because of these impairments, handicapped students may need special education and related services.

Technology education professionals will most often provide educational experiences for students who fall into the category of high-incidence handicapped (those who comprise approximately 80% of the total population of handicapped learners). Among this group are students who are learning disabled, mildly retarded, speech impaired, and mild-to-moderate hearing or

visually impaired. Traditionally, these children are able to achieve success in the regular school environment with supportive services and modifications in educational curriculum and teaching strategies.

Low incidence handicapped children may occasionally be placed in regular technology education programs; however, most will be placed in self-contained situations such as "sheltered workshops" or other institutional settings where their needs are more appropriately met. Among the students in this category are the severely and profoundly retarded and the severely emotionally disturbed. Profoundly deaf or blind and orthopedically handicapped children also fall into the low incidence category; however, because of their general learning potential some have been able to function successfully in regular access/barrier-free school programs.

The placement of low incidence learners into the least restrictive environment must be determined through an extensive multifactored evaluation conducted by qualified specialists. Technology education educators should be involved in the evaluation procedure particularly to help assess a student's potential to function in a technology education learning environment. Generally, these special needs students will require support services in addition to an access/barrier-free building; for example, interpreters, educational tutors/aides, and adaptive production jigs or fixtures.

The following provides a brief description of various handicapping conditions. These guidelines will facilitate technology education professionals' understanding of the general physical, intellectual, and social characteristics of the handicapped.

Mildly retarded students will blend into society if given appropriate educational experiences that enable them to live and work independently. Typically, these students have an IQ between 50 and 80 and can be expected to learn to read and perform math skills at a level averaging between third and fourth grade. Also, mildly retarded students are often characterized by poor self-concepts and show deficits in adaptive (social) behavior. Mildly retarded students have traditionally been served in resource rooms and mainstreamed environments in elementary and secondary school programs.

Moderately retarded students tend to learn at a slower rate than do the mildly retarded. The moderately retarded can be taught tasks or activities which require single skills under adequate supervision. These students normally have IQ's below 50, and intellectually, do not develop beyond 45% of "normal." Many are now being integrated into public school programs as a result of P.L. 94-142.

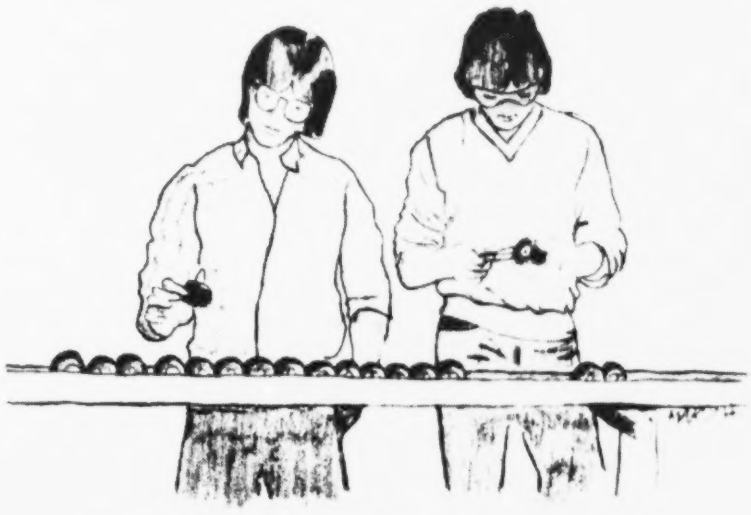
The *severely retarded* have an IQ range of 25 to 40 and require supervision during the majority of tasks that they perform. With appropriate training and supervision, many of these persons tend to function well in sheltered workshop environments.

The *profoundly retarded* are those students with IQ's below 25. They require a maximum amount of supervision, especially with tasks requiring self-care. Generally, the mainstreaming of severely and profoundly retarded in the public school is not to be perceived as an appropriate placement.

Learning disabled children have normal or above average intelligence but exhibit a specific learning disorder in one or more basic processes involved in understanding or using spoken or written language. Their learning problems are not due to visual, hearing, motor, or environmental handicaps, nor are they the result of mental retardation or emotional disturbances. Typical disorders that may cause learning disabilities are perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

Hyperactive or hypoactive children are perceived as having behavioral handicaps because they exhibit inappropriate behaviors or feelings that interfere with normal functioning in school. Most of these children can adjust well to the regular classroom with appropriate medical, psychological, and educational intervention.

The *severely emotionally disturbed or severely handicapped* student exhibits undesirable behaviors or feelings over a long period of time that adversely affect educational performance. Such children have an inability to learn that cannot be explained by intellectual, social, or health factors. School related characteristics may include poor interpersonal relationship with peers and teachers; a general pervasive mood of unhappiness or depression; periods of self-stimulation or withdrawal; and a tendency to develop physical symptoms or fears associated with personal or school problems. The term includes autistic or schizophrenic children, most of



whom may profit substantially from instruction as determined through comprehensive evaluation.

Visually impaired students are handicapped in a normal educational program by their difficulty or inability to see. Under this heading, students are classified as partially sighted, legally blind, or profoundly blind. However, many have demonstrated the ability to develop proficiency in using technology education equipment with some modification of the learning environment. Partially sighted or legally blind students are those who can learn to read print, but whose vision is limited (even with corrective devices) and who need modifications in order to succeed in a normal educational program. Partially sighted persons have a vision of 20/70 to 20/200 with corrective lenses. Legally blind persons have less than 20/200 vision with spectacles.

The profoundly blind comprise the most severe visual classification. They cannot tell light from darkness and as a result, cannot see print. (But can benefit from instruction in Braille.) These students must depend totally on their other senses to function satisfactorily in an educational program.

Orthopedically handicapped students are normally limited in mobility, sitting, and/or the use of tools and equipment because of muscular, skeletal, or neuromuscular impairment. Causes of orthopedic handicaps are cerebral palsy, spina bifida, curvature of the spine, muscular dystrophy, hemophilia or other defects in legs, arms, neck, or hips. Orthopedically handicapped students are generally average or above average in intelligence and can function in a regular school environment that has been adapted and made barrier/access free.

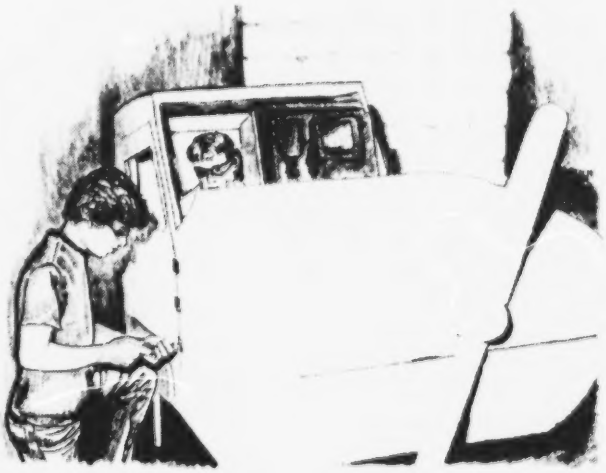
Hearing impaired students have a loss of hearing which affects their performance in a normal educational setting. Their sense of hearing can be limited in many ways. For example, if students cannot hear the ordinary sounds of activity around them, then they are considered deaf. However, when students can hear, but only hear part of what is said, then they are considered hard-of-hearing. Hearing losses may be mild, moderate, severe, or profound.

Hard-of-hearing individuals have some ability to hear and understand the spoken word. Although some words may be audible, the pitch and frequency of these sounds may make it difficult for these persons to ascertain their meanings. Sounds are not necessarily just softer to these individuals but may also be garbled and distorted. Some hard-of-hearing students may require the use of hearing aids and/or rely on lip reading. Likewise, deaf individuals must always rely on the use of an interpreter and/or lip reading.

Speech impaired students normally have speech patterns that are noticeably different from the norm. There are many forms of speech impairment, ranging from complete inability to speak to minor articulatory defects. Furthermore, there are many causes for speech difficulties, ranging from delayed speech and hearing impairments to cerebral palsy and cleft palate.

Other health impaired students are so categorized because they demonstrate limited strength, vitality, and alertness. The conditions of the other health impaired student are caused by chronic health problems such as heart conditions, tuberculosis, rheumatic fever, nephritis, hepatitis, asthma, epilepsy, leukemia, diabetes, or cystic fibrosis.

Students classified as *multihandicapped* exhibit a combination of two or more of the previously mentioned handicaps. For example, a student may be deaf and blind or orthopedically disabled and mildly retarded. As a result, special accommodations are necessary to facilitate their educational development.



Planning Technology Education Programs for Special Needs Learners

A Commitment to Excellence

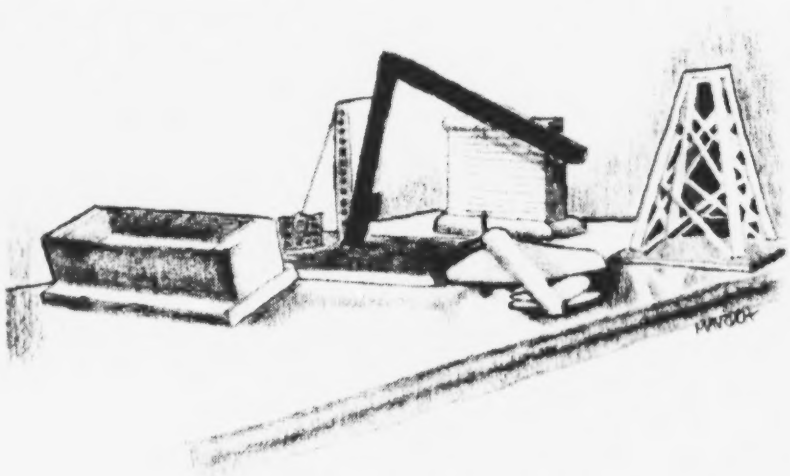
While technology education is seen as an important area of study for all students, there is a temptation to exclude lower functioning exceptional learners from such instruction. Generally, educators welcome the opportunity to work with gifted and talented students; however, some concern exists when the mildly handicapped are enrolled in technology laboratories. It is imperative that educators realize that technology education is for all learners, regardless of their respective disadvantages or handicaps. In fact, as our world becomes more technical, there will be an increased need for lower functioning citizens to be technologically literate in order to survive socially and economically. Technology educators should be aware that the *Standards for Technology Education Programs* (Dugger et al., 1985) includes 19 standards pertaining to special needs students and that these standards support serving exceptional learners as a prerequisite to achieving excellence for technology education programs (See Appendix B).

Technology Education

For the purpose of this monograph, the operational definition of "technology education" will be adopted from the *Jackson's Mill Industrial Arts Curriculum Theory* (1981) and shall be defined as:

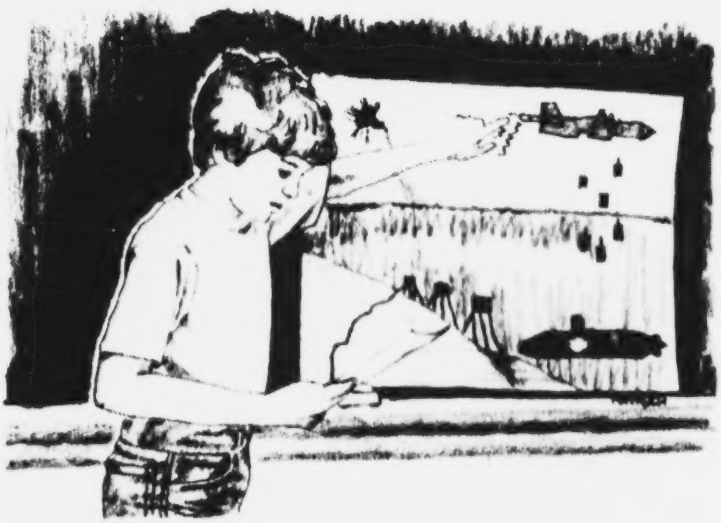
> . . . a comprehensive educational program concerned with technology, its evolution, utilization, and significance; with industry, its organization, personnel, systems, techniques, resources, and products; and their social/cultural impact. (pp. 2-3)

Further, the role of technology educators should be to deliver instruction to all learners (including exceptional persons) that provides "insight into the relationship of technical means to human beings, social purpose, and the environment" (p. 14). This major goal may be accomplished by organizing courses of study around subsystems of human technical endeavor inclusive of communication, construction, manufacturing, and transportation technology.



Importance of Technology Education for Special Needs Learners Technological Literacy

As we move towards the twenty-first century, technology will increasingly impact upon consumer products and services as well as employment demands. Therefore, there is an increasing need for citizens to be technologically literate in order to learn to use and control technology efficiently and effectively. Technology educators can provide special needs learners with experiences that meet their unique developmental needs and interests while satisfying the educational demands of a sophisticated technological world. Students with unique learning problems are greatly dependent upon the knowledge and skills acquired from technology education activities. Unlike their "normal" peers, special needs students have fewer opportunities for training and limited avenues for economic success. Therefore, the technical skills and competencies that are acquired through technology education activities must provide special need students with better opportunities to become more self-reliant, resourceful, and productive citizens.



Contributions of Technology Education to Selected Areas of Human Development

The technology education curriculum provides unique experiences essential to the total educational program for special needs learners. These activities will have a decided affect on learners' successes or failures in adult life. Such experiences include safe tool and machine usage; product/material selection and usage; purchasing and utilization of tools and supplies; and an introduction to appropriate work habits. The instructional opportunities will enhance the development of the special needs learner's self-concept and personal worth, judicial selection and use of consumer goods and services, appropriate use of leisure time, and develop career skills necessary for future employment. Further explanation of these four developmental principles will be provided to demonstrate their significance and value for all school children, especially those with unique learning needs.

Technology Education's Contribution to Improved Self-concept

The self-concept of a special needs learner is often low because of past failure or the fear of failure. By experiencing success in technology education activities, the "failure syndrome" that many exceptional learners possess may be reduced. Their positive self-image and personal worth can be strengthened through their own constructive means. In fact special needs learners sometimes use activities in the technology education laboratory as an alternative means of self-expression. This is clearly supported by Ernest Boyer, President of the Carnegie Foundation for the Advancement of Teaching (1985) who stated:

> Our children should understand that we communicate not just through words but through music, through dance, through the visual arts, and even through the craftsmanship and the beauty of those things we create (pp. 4).

Psychologically, individuals have needs for self-assurance and successful experiences which can be achieved through technology education. Learners can become aware of their own strengths, limitations, interests, and levels of motivation as they participate in a variety of subject areas in school. We know that most students are capable of achieving academic success and satisfaction in their program of studies. Past experience suggests that this is especially true for those students enrolled in technology education laboratory activities. Many special need students, who are unsuccessful in courses such as English or Geography, often experience their first real school-related success in technology education. It is especially important for children to experience success and pleasure in educational pursuits, and technology educators play a major role in providing these opportunities.

Technology Education's Contribution to Consumer Literacy

Today, with a wide range of constructed and manufactured products available to consumers, it is becoming increasingly important for students to become proficient not only in the selection, use, maintenance, and servicing of consumer products, but also in the selection and use of consumer services as well. Students need to select a product by its merit and to determine the size and quality that best meets their needs. Through the study of technology, students can learn to discriminate between good and inferior products while learning the relationship between economics and quality products. Further, they can learn how to select technical services, as needed, to appropriately service and/or maintain their dwellings, appliances, and other constructed and manufactured products. Needless to say, servicing and maintenance of consumer products should not be ignored in technology education programs.

Technology education, through the study of finished products (particularly as their costs relate to production, transportation and handling), is especially equipped to educate the consumer. Activities such as material and product testing can be carried out in the classroom to assist students in becoming better consumers of products. Students use a variety of tools, materials, and processes while learning about moisture resistance and durability. Thus, technology education activities for the special needs learner serves the purpose of increasing consumer knowledge to a point where students are better prepared to select, purchase, use, and maintain products.

Technology Education's Contribution to Recreational Interests

Technological developments will increase efficiency of production methods thus reducing the number of workers required both in numbers and time commitments. These developments will provide workers with additional release time for recreational activities. Leisure time activities can have rich recreational and social value while contributing to one's perception of self-value. Through exposure in technology education, special needs learners may develop avocational pursuits or hobbies involving the application of technology to such activities as materials processing (the "home workshop"), communications (photography, short-wave radio, or electronics), or energy/power (installing solar collectors, insulation, or servicing automobiles). Furthermore, activity-based instruction that is characteristic of technology education, can provide a therapeutic function giving students the opportunity to reduce stress related tension and feelings that may result from the school or work day.

As a rule, people select activities which they can do well and achieve personal success and immediate reinforcement. In experimenting with different technical materials and processes, special needs students can achieve success and choose from a variety of craft-related hobbies that are not only therapeutic but are intrinsically pleasing as well.

Technology Education's Contribution to Career Development

The student is exposed to a wide range of occupations in which people make contributions to the "world of work" in technology education activities. Career exploration is important for special needs learners in order that they will have a firm basis to make occupational decisions later in life.

Technology education is especially well suited for career awareness because of the broad range of occupations that are an integral part of industrial technology. For example, in an enterprise activity, students explore occupations such as "materials handling," "packaging," "sales," "management," and "industrial relations." As a result of technology education activities, career awareness is broadened with students gaining insight into many different work roles. This is particularly critical as special needs students make the transition from school to work.

The experience in technology education also contributes to prevocational development. Students have opportunities for exploration in a broad number of technological areas using industrial tools, materials, and processes in a laboratory environment. Such experiences simulate the industrial work environment and production processes common to construction and manufacturing industries. This enables students to be better prepared to make informed choices for career preparation while having entry-level skills and knowledge for prospective vocational training.

Technology Education Meets Diverse Learning Styles

The instructional content and methodology of technology education courses satisfies the diverse learning styles of special needs learners. For example, technical information and performance skills taught through laboratory activities and related instructional experiences are enhanced by the following:

1. Concrete learning situations versus abstractions.
2. Immediate feedback of performance versus delayed evaluation.
3. Clarification/application of academic concepts through "hands-on" learning experiences (e.g. transfer of measurement and math skills to production processes).
4. Individualized instruction as well as group instruction (including peer tutoring or team production efforts).
5. Multisensory instruction (e.g. modeling observed behavior, use of three-dimensional models, integrating written directions with pictorial formats).

Extensive research in the area of learning styles has become an important topic which has implications for technology educators. Learning style has cognitive, motivational, and physiological elements. Research in the 1970's and 1980's yield scores of learning style instruments for assessing learning preference. The Ohio State University's National Center for Research in Vocational Education published the results of a two-year study of instruments that identifies learning and cognitive style (Kirby, 1979) and selected instruments appraised as having "impressive reliability and face and construct validity" (p. 72). A more recent study, the *Learning Styles Network Instrument Assessment Analysis* (1983) summarizes reliability and validity data for many of the better known instruments in the field.

While we are not suggesting that technology educators let instruction be guided solely by matching teaching styles with learning styles, it is suggested that teachers become more aware of the variety of learning styles present in their classrooms and learn to more systematically assess learning preferences which may dictate a variety of teaching strategies. For example, a determination that some learners are more visually oriented than others may signal the instructor to use more visual methods of teaching incorporating models, transparencies, films, and the like. Some of the kinds of questions that technology educators should ask when assessing learning styles are:

Do my students learn best when:

- Instruction is visual?
- Instruction is verbal (e.g. reading assignments)?
- Instruction is delivered by lecture?
- Instruction is delivered by demonstration?
- Instruction is followed by practice?

Technology educators are also encouraged to aid learners to assess their own respective learning preferences thus enabling them to better select appropriate situations for themselves. For example, mildly handicapped students tend to have marked deficits in reading and mathematics thus reducing their ability to analyze working drawings, calculate dimensions, and transfer measurements. Demonstration provides a physical presentation of a performance task/procedure as contrasted with the imaginative conceptualization attained by reading directions. Such demonstrations may be sequenced in steps to provide the shaping or chaining of behavioral sequences. If learners are aware that they learn best this way, they can request such demonstrations from peers or instructors to clarify procedures.

Other ways of compensating for learning deficits and alternative learning styles include the use of three-dimensional models and pictorial representations (perspective, isometric, and oblique drawings) rather than the conventional multi-view, orthographic drawings. The former provides a replica or realistic presentation of what the student needs to visualize in order to work rather than the latter's reliance on the "linear/sequential" method of cognitive processing of "flat" images in two-view drawings.

The teaching of reading and problem solving can be enhanced by developing instructional plans/directions that combine pictorial drawings with written directions. The pictures depict the sequencing of the production and assembly tasks with accompanying written directions prepared in short, simple sentences. After students look at pictures and describe activities, they can then read the written directions for supplemental information. This "associative" task tends to enhance clarification of concepts for mildly handicapped learners.

Accommodating Special Needs Students In The Technology Education Program

Education methods and procedures, instructional programs and materials, and school facilities must be modified to allow for individualized instruction to serve special needs youth in technology education classes. The technology education teacher cannot accomplish this task alone. Other professionals from areas such as special education, rehabilitation, school psychology, guidance, and from the community can help. These cooperative efforts can ensure that technology education programs for special needs learners are appropriate and have the fundamental elements for success.

The teacher remains the central factor governing the potential success in technology education of the special needs student. The teacher's attitude, personality, and self-concept will help govern student performance. Teaching special needs children is very much like working with any other student. Each needs empathy, guidance/direction, and an appropriate and challenging learning environment, carefully managed by a knowledgeable teacher. There are, however, some subtle as well as obvious characteristics of certain learners that require a change of teaching style. For example, teachers who tend to "kid" or tease their students may find that children with poor self-concepts or low self-esteem may interpret this as ridicule and cruel and inappropriate punishment. Likewise, special needs children want empathy—understanding of their limitations and the desire to help remediate them (and also to build upon strengths)—rather than sympathy. Teachers must continue to be firm but fair, consistent and yet flexible, and concerned and caring enough to challenge special needs students to achieve new goals and experiences.

Understandably, most technology education teachers may be a little anxious about working with "different" students. Determining what content is appropriate to teach or emphasize; how to establish performance criteria; how to modify the laboratory; how to allocate a reasonable amount of time to instruct, tutor, and supervise special needs children in the laboratory; and how to organize for laboratory instruction may be a few of the teacher's questions or concerns. Another concern is the technology education teacher's role in preparing the Individualized Education Program (IEP) required by federal law for each handicapped child.

While it is difficult to generalize, it has been the experience of many successful technology education teachers that typical technology education instructional techniques lend themselves to various groups of learners. The emphasis on "learning by doing," teaching through demonstration and modeling, and organizing instruction in step-by-step procedures in a logical sequence of events helps to improve a student's ability to conceptualize and "imitate" observed responses.

The Individualized Education Program

The Individualized Education Program (IEP) provides an excellent source for student assessment, identification of individual needs, and development of instructional activities for the learner. Each IEP should include as a minimum:

- A statement of the child's present level of educational performance.
- A statement of annual goals, including short-term instructional objectives.
- A statement of the specific special education and related services to be provided to the child, and the extent to which the child will be able to participate in the regular educational programs.
- The projected dates for initiation of services and the anticipated duration of the services.

Appropriate objective criteria and evaluation procedures and schedules for determining, on at least an annual basis, whether the short-term instructional objectives are achieved. Technology education teachers should become involved in the development of the IEP as either members of the development team or as consultant to that team. The information presented in the IEP should serve as a guide for curriculum modifications needed to accommodate specific handicapped students into technology education programs and also document the need for supportive resources.

Instructional Practices

Facilitating Instruction

In facilitating instruction in technology education programs for special needs learners, teachers should realize that they need not take on this task by themselves. There are supportive services in and out of the school that teachers can use when designing instructional strategies and programs. Four practices that have been successfully used by technology education teachers are:

1. Peer tutors.
2. Cooperative planning strategies with special education personnel.
3. Adult aides or volunteers.
4. Resource specialists.

Peer Tutors

The use of peer tutors has been widely used in other school subject areas with a high degree of success. Peer tutors can help with technological activities that involve reading, measuring, and repeating of teacher demonstrations. Peer tutoring can also aid in the development of positive interpersonal relationships among students of various levels and abilities in technology education classes.

Cooperative Planning

Many technology education teachers fail to take advantage of cooperative planning efforts with special education colleagues. For example, technology education activities requiring measuring, computing, and reading are relevant instructional lessons that could be taught by special education teachers as a part of regular special education classes in math and language arts instruction. In fact, special education teachers are delighted to have good practical examples that reinforce such concepts. Such relevant learning experiences enhance the remedial instruction efforts of special education teachers.

Adult Aides

Adult aides and volunteers are used quite frequently by schools today. Such persons can provide valuable assistance to technology education classes not only from a tutorial standpoint, but also by bringing their rich experiential backgrounds of the "real" world into technology education classes. In most cases such assistance can be obtained through requests to the school administration and parent-teacher organizations, or by contacting community agencies such as senior citizen centers.

Resource Specialists

In addition to peer tutors, cooperative planning, and adult aides, technology education teachers can seek assistance from various other resource specialists. These specialists are usually funded by special education and/or vocational education. Examples are the Related Vocational Instructor in Georgia, the Vocational Resource Instructor in Missouri, and the Designated Vocational Instructor in Wisconsin (Scott, Buffer, Erekson, & Williams, 1985). Special education resource center specialists also provide inservice and consultative services to regular education teachers in many states. The reader is encouraged to refer to Appendix A of this monograph for a listing of Regional Resource Centers (RRC's) and other agencies which can also be of valuable assistance.

Technology Education Placement Options

As mentioned earlier, Individualized Education Plan (IEP) should be very prescriptive in terms of the extent of services that exceptional learners (handicapped) will receive when mainstreamed into technology education classes. For example, some students might be totally mainstreamed, with no supportive services. On the other hand, moderate to severely handicapped students could be placed in self-contained technology education classroom for a limited period of work adjustment before being selectively integrated into regular classes.

A continuum of technology education placement options is shown in Figure 1. This continuum is adapted from "A Continuum of Vocational Placement Options" (Ohio Department of Education, 1982).

A description of these placement options follows:

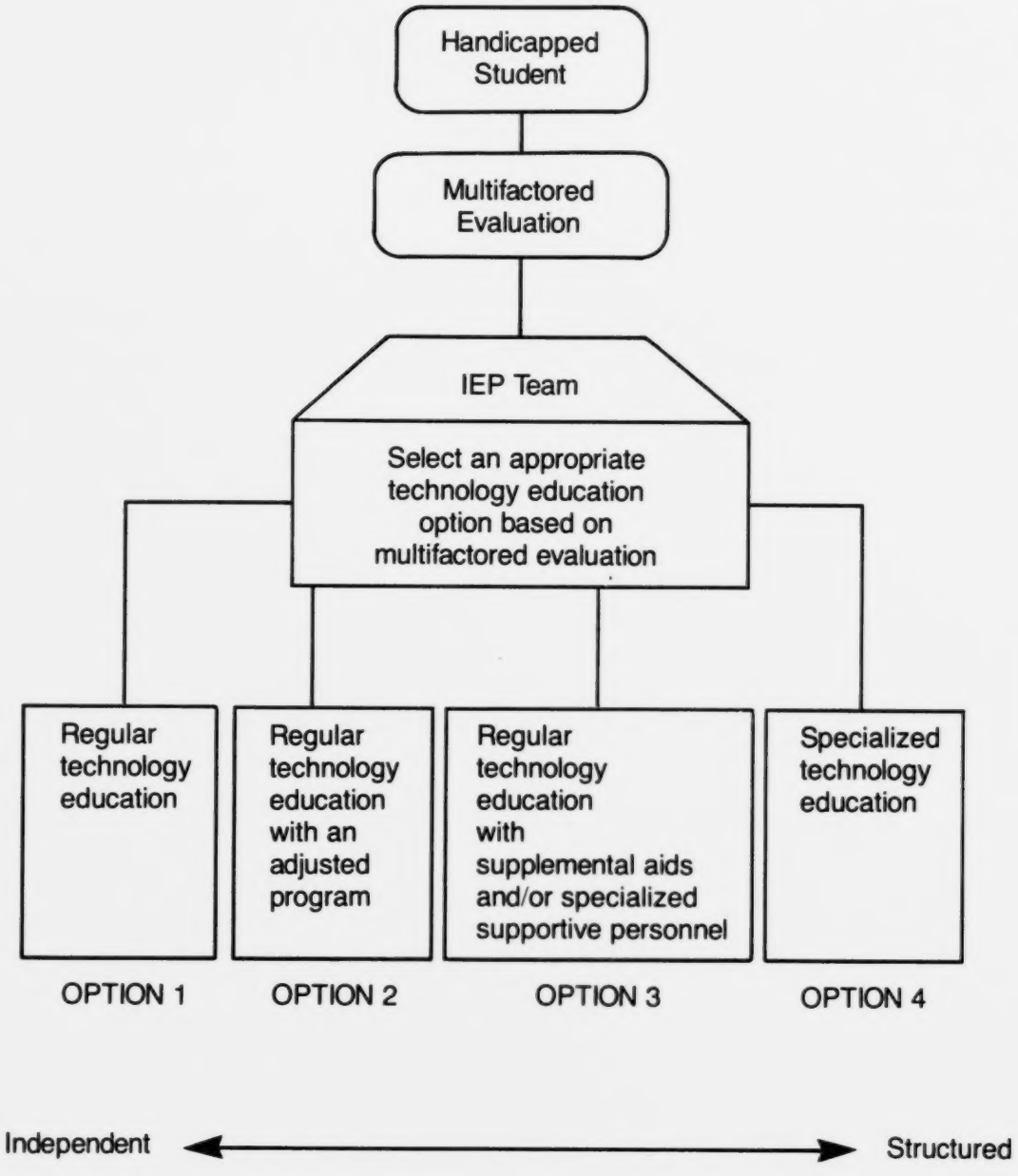


Figure 1. A continuum of technology education placement options

Option 1

Regular Technology Education

General Description

This placement option encompasses a program which is currently offered to non-handicapped students enrolled in technology education programs. It provides supportive assistance to students to enhance and support their educational experience.

Services Needed

The services needed to implement this option are those that are currently being provided to students who are enrolled in regular technology education.

Option 2

Regular Technology Education with an Adjusted Program

General Description

This placement option is designed to serve handicapped students who are enrolled in regular technology education classes, but who may require an adjustment to their program in order to succeed. These students may not require additional aids or services to function in the regular program; however, teachers may have to use alternative teaching strategies including peer tutoring, small group instruction, and the use of various audio-visual resources.

Services Needed

The services needed to implement this option include the provision of technical assistance to the instructors in order to assist them in developing the flexibility to adjust their teaching methods in the technology education program. It may require careful examination and adjustment of program guidelines to assure flexibility in order to meet students' individual instructional needs. An example would be the provision for oral tests for poor readers.

Option 3

Regular Technology Education with Supplemental Aids and/or Specialized Supportive Personnel

General Description

This placement option is designed to provide supplemental aids and/or specialized supportive personnel necessary for handicapped students to receive appropriate technology education in the regular educational environment in accordance with an individualized plan. This instruction may supplement the technology education instruction but should not supplant the regular instructional program.

Services Needed

The services needed to implement this placement option are those aids and specialized supportive personnel necessary to enable handicapped learners to receive an appropriate technology education program in the regular technology education classroom. The aids may include, but not be limited to, the following:

- Laboratory equipment adaptations
- Instructional materials development/modification
- Transportation
- Instructional materials and various teaching aids
- Specialized equipment and adaptive devices

Option 4

Specialized Technology Education for the Handicapped

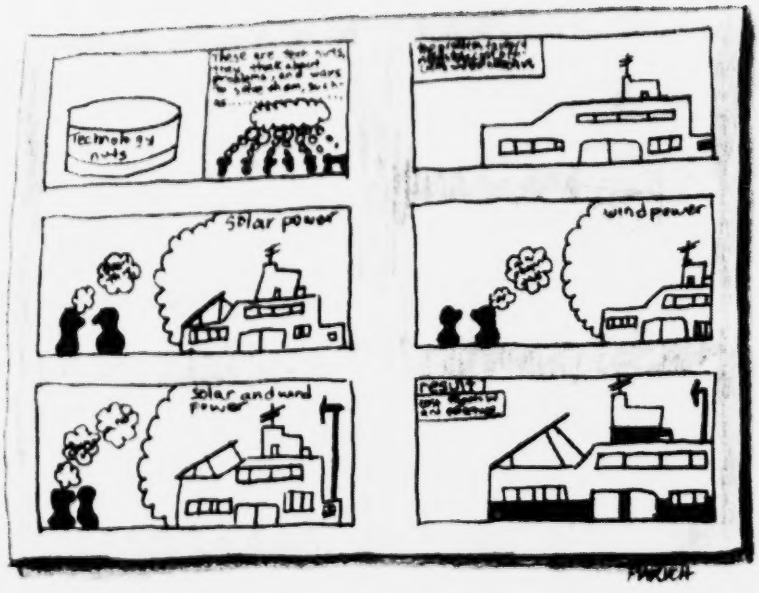
General Description

This placement option is designed to serve handicapped students whose handicapping conditions are so severe that they require a modification of location from the regular technology education program to provide part-time or full-time technology education. This option may be located in a:

- Public school building
- Separate school in the district
- Public school program located in a separate facility
- County board of mental retardation and developmental disabilities facility
- State residential school for the deaf or for the blind
- State institution

Services Needed

The services needed to implement this option should consist of instruction that is as close as possible to that of a regular technology education program. Instruction provided under this option would occur in a self-contained class with the goal of mainstreaming the student into one of the previously mentioned options as soon as possible. It should not be viewed as a permanent placement unless, of course, it is the least restrictive alternative placement which maximizes the potential of the learner.



Vocational Evaluation (Assessment)

A commonly accepted definition for vocational evaluation is that of the Tenth Institute of Rehabilitation Studies (1972). Their definition is as follows:

> Vocational (work) evaluation is a comprehensive process that utilizes work, real or simulated, as the focal point for assessment and vocational counseling to assist individuals in vocational development. Vocational (work) evaluation incorporates medical, psychological, social, vocational, educational, cultural, and economic data to assist in the attainment of the goals of the evaluative process. (pp. 3)

Students who enter technology education programs should gain the benefit of vocational assessment or evaluation where informal or formal standardized procedures are used to identify specific personal worker traits and characteristics (Buffer, 1982). Vocational evaluation can be viewed along a continuum of simple paper-pencil tests, to commercially available evaluation systems, to actual job placement and resultant behavioral observations. According to Kimeldorf (1984) a vocational evaluation that is keyed to existing technology courses and placement options within the school and community can provide insight into student interests, aptitudes, and areas where students may need assistance or preparation.

Vocational assessment aids the special needs learner in identifying strengths and weaknesses. It assists students in becoming self-reliant productive members of society. Vocational assessment serves as a major deciding factor in the development of a vocational plan of action for the special needs learner.

Vocational assessment should be used as a positive tool for the person being evaluated. Its purpose is to assess a person's vocational strengths and weaknesses and should be used as one in a series of other counseling devices to help with placement of the student in a future job or training program. Too often, vocational assessment only focuses on student weaknesses while ignoring areas of strength. Vocational assessment can help insure that exceptional learners find employment where they can succeed by developing a vocational plan of action that capitalizes on the learner's abilities, not disabilities.

Adapting Instructional Practices

A common approach to adapting technology education instruction to meet the special needs and capabilities of low functioning exceptional learners is to assign fewer and simpler projects often using patterns or kits, fewer and less complex laboratory experiments, fewer or no related reading assignments, and to reduce achievement criteria and testing. The emphasis has been on "craft-like" projects to keep the students busy and happy. Generally speaking, the expected achievement performance has been much lower than that established for non-handicapped children. Moreover, such performance criteria as time, rate of progress, critical specifications, and problem-solving activities are relaxed when adjusting instruction for retarded youth. However, since exceptional learners will compete and function in our technological society, they must be required to actively perform challenging and relevant laboratory activities. These students can learn if given the opportunity and proper instruction. Further, appropriate placement and effective use of instructional technology are a must. Examples include the use of cassette recorders to tape lessons, individualized computer assisted instruction lessons, interactive video, and the design and use of adaptive devices (e.g. jigs and fixtures).

Modification of the Physical Environment

Generally, modification of tools, facility, or equipment are only needed for certain handicapped individuals. For example, students in wheelchairs need some special adaptations to desks, machinery, and workbenches; but these problems can usually be remediated on an individual basis. Elevators, ramps, wall railings, wide aisles, and specially-designed restroom facilities are a few examples of building changes that may be necessary to accommodate some ambulatory students.

Some adaptation must be made to ensure the safe and effective use of tools and equipment in the technology education laboratory. For example, teachers have made "jigs" and "fixtures" to allow physically and sensory impaired students to use power machinery and tools to manufacture products. Such devices serve as "enablers" to compensate for one's limited cognitive or psychomotor functioning much as spectacles improve a person's ability to read. Other enablers may include a combination of flashing lights and bells which may be used as a signalling system in the laboratory to accommodate both hearing and visually impaired children. Work stations may need to be continually examined to ensure that adequate safety devices are in place and that physical obstacles are removed to enable sensory or physically impaired students full access to the production laboratory.

By and large, technology education teachers possess general technical "know-how" when it comes to designing special adaptive equipment. However, consultation with special education professionals is a "must" when assessing individual needs and making subsequent adaptation.

Modification of Curriculum and Instructional Approaches

Modification of curriculum materials and instructional approaches may be necessary to meet the individual needs of various special needs students. For example, technology education teachers may need to provide more visual materials for learning disabled or disadvantaged youth, while employing various behavior modification teaching strategies for certain groups of mentally retarded or behavior-disordered learners. Furthermore, enrichment activities may need to be structured for talented and gifted students to provide a challenging learning environment.

When modifying curriculum materials and instructional approaches it is necessary to apply sound educational principles that will help all students, especially those who have special needs. The following is a list of some general instructional strategies and techniques which might be used when planning and organizing technology education programs for special-needs youth:

- Use both visual and verbal teaching techniques.
- Vary teaching techniques—make use of modeling, imitation, discussion/lecture, demonstration, and other techniques.
- Reinforce appropriate behaviors that are in context with desired learning outcomes. An adequate feedback system should be provided, whether it be verbal or nonverbal, oral or written. Lessons should be planned so that appropriate feedback and reinforcers are provided.

■ Organize instruction to guarantee some degree of successful learning outcomes. Do not perpetuate the "failure syndrome" associated with some special needs youth.

■ Use assessment data to ascertain the optimum level at which the special needs learner can work. Work that is too easy will not challenge the learner. Likewise, material that is too hard will cause unnecessary anxiety thus reducing student motivation and ability to learn.

■ Repetition is an important teaching technique for most learners and usually creates a positive momentum for teaching hands on learning activities.

■ Help students develop a sequential and simple way of correcting problems which might occur. Keep steps small and build on previously learned tasks.

■ Special education teachers and tutors can correlate the teaching of related subject matter to technical production activities. Also, remedial instruction in basic-subject skills may be provided.

■ Special needs students should be made to feel a part of the technology education class, rather than "separate" or "special." Facilitate their active participation in group activities such as mass production and laboratory maintenance so that they perceive themselves as an integral part of the learning team.

■ Technical or related career information should, whenever possible, be integrated with laboratory activities and real life examples to show the immediate application of the information.

In addition to the aforementioned general instructional strategies and techniques that apply to all exceptional learners, there are some specific instructional strategies which have a direct relationship to respective exceptionality areas. These strategies are outlined in the following chart:

Disadvantaged

1. Provide current periodicals and books written on appropriate reading levels.
2. Encourage group projects that facilitate social development.
3. Offer praise and encouragement
4. Use a wide variety of instructional media and materials.
5. Provide relevant and concrete activities.
6. Relate "hands on" experiences to development of communication and social skills.
7. Provide activities that are short in duration.

Emotionally Disturbed

1. Use a highly structured, routine oriented method of teaching.
2. Explain the standard of acceptable behavior: be firm, fair, and consistent in discipline.
3. Use behavior management teaching strategies (e.g. positive reinforcement).
4. Reduce visual and auditory distractions.
5. Set one goal at a time and approach goals in a step-by-step, sequential fashion.

Gifted & Talented

1. Encourage research and development activities.
2. Provide activities that are challenging.
3. Avoid activities that call for routine and drill.
4. Build abstract reasoning and conceptualization into activities.

Hearing Impaired

1. To help the hearing impaired student lip-read better:
   A. Always face the student when speaking.
   B. Articulate clearly and with normal speed, enunciating each word but without exaggerating or overpronouncing.
   C. Speak in a natural tone of voice.
   D. Stand still when talking and keep within close range of the student.
   E. Rephrase sentences if the student doesn't seem to understand, you may be using words he or she is not familiar with, or a particular combination of lip movements may be very difficult to lip-read.
   F. Avoid standing with your back to a window or other light source.
   G. Let your expressions and motions include emphasis and feeling.
   H. Avoid covering your mouth with your hands.
2. Be sure that the student is paying attention when you assign him or her a task.
3. Try to maintain eye contact with the student.
4. Write on the board without speaking; then turn back to the class and speak.
5. Use many visual aids and written materials.
6. Provide outlines and vocabulary lists for any complicated topic being discussed.
7. Seat the student advantageously when he or she is participating in a group.
8. Provide the student with a brief outline or script printouts to follow a lecture, movie, or filmstrip.
9. Hearing impaired students may have difficulty reading the lips of male teachers with large quantities of facial hair.

Learning Disabled

1. Give written and oral tests.
2. Provide visual clues to problem solving tasks.
3. Double space typed handouts.
4. Keep assignments simple (reduce to one task).
5. Introduce vocabulary words before teaching an activity.
6. Have the student repeat steps of assembly tasks to you.
7. Underline key words in reading assignments.
8. Utilize tape cassettes, films, and filmstrips.

Mentally Retarded (Developmentally Handicapped)

1. Organize material in small steps.
2. Provide immediate feedback. Utilize positive reinforcement as much as possible.
3. Use tutors, aides, or peer teaching techniques.
4. Use imitation and modeling techniques.
5. Provide visually oriented instruction.
6. Use demonstration techniques.

Orthopedically Handicapped

1. Do not "coddle." Allow the student to do his/her own work and utilize the same evaluation standards as with non-ambulatory students.
2. Employ the "buddy system" for such activities as obtaining "hard to reach" stock or for reaching inaccessible switches or handles.
3. Focus on the student's abilities rather than the student's disability.
4. Make necessary modifications to the physical plant, tools, and machines.

Speech Impaired

1. Never call attention to a special speech problem.
2. Pay careful attention when the student is speaking.
3. Do not say words for students when they have difficulty in producing the words.
4. Provide success-oriented, non-speech activities.
5. Use the consultative services of a speech therapist.
6. Label tools in the laboratory.
7. Use diagrams, pictures, and charts where possible in the place of written material.

Visually Handicapped

1. Do not raise your voice. The blind are not necessarily hearing impaired.
2. Speak directly to the blind student, not to a third party.
3. When talking to a blind student, use the words you normally use. Do not try to avoid words like "look" and "see," which are part of everyone's vocabulary.
4. If discussing a form or handout, describe these to the visually impaired.
5. When teaching or explaining something to a blind person, be consistent in your directions since he or she cannot watch what you are doing. Explain fully and whenever possible let the sense of touch substitute for vision.
6. Say what you are doing when you demonstrate. Check your terms to avoid abstractness (e.g., "This fastens on there . . .").
7. Make clear how similar parts or processes can be distinguished by touch or sound.
8. Make sure that you say everything you write on the chalkboard.
9. Encourage sighted classmates to be helpful but not to do the student's work.
10. Seat the visually impaired student in a position where he or she can hear you clearly and has adequate lighting.
11. Keep the students informed of any changes in arrangements of furniture or equipment.

Identifying and Using Resources to Facilitate Technology Education Instruction

There are a number of excellent books, articles, projects, agencies, support services, and organizations that provide assistance to teachers of special needs students. In most instances, supportive services are more readily available for special needs students than for non-special needs populations. There are more descriptive records, available test data, unique counseling services, and diagnostic records regarding abilities and disabilities. For example, the IEP should provide a wealth of information to help technology education teachers accommodate special needs students in the laboratory.

In addition to those already mentioned in this monograph, support service personnel within local schools may include special education resource teachers, learning disability tutors, remedial reading teachers, vocational counselors, work-study coordinators, work adjustment teachers, and vocational evaluation specialists. Teachers of special needs students are members of a professional team where dedicated individuals are available to provide assistance and support. Technology educators should consult colleagues to identify local support services and resources.

The education of special needs students is not a task that technology education teachers must face alone. There are a number of governmental agencies and civic organizations that provide support services to parents and teachers of special needs students. For example, the Lions Club may provide visual examinations, medical treatment, or glasses for visually handicapped children. Likewise, the Bureau of Vocational Rehabilitation or the Area Community Mental Health Center should be contacted for medical and psychological evaluations, counseling, and for specialized equipment which the school cannot supply but is needed to ensure successful functioning within the technology education program. Check the Yellow Pages of the local telephone directory for other agencies, addresses, and telephone numbers. Also, a listing of major regional and national agencies and professional associations that provide support services for teachers of special needs persons can be found in Appendix A. Educators should feel free to contact these agencies for professional assistance in developing instructional materials and services.

Each school functions a little differently regarding the use of support services operated within the school. Teachers should become aware of their school's policies governing such services and should use the available services whenever needed.

Teachers usually deal with resource information in one of two ways. Some teachers feel a need to know all aspects of a student's abilities and disabilities to feel secure about working with that individual. These teachers generally review all available records and contacts with support services. Other teachers prefer to have a brief conversation with the special education teacher, counselor, or school psychologist rather than examine student records or other related data.

Some educators believe that information regarding a child's abilities (whether strengths or weaknesses) tends to influence the teacher's attitude and behavior towards the child which then may have an impact on the child's behavior. Therefore, it is important to think positively about a child's potential and trust his/her ability to progress within a specialized program.

A Challenge to the Teacher

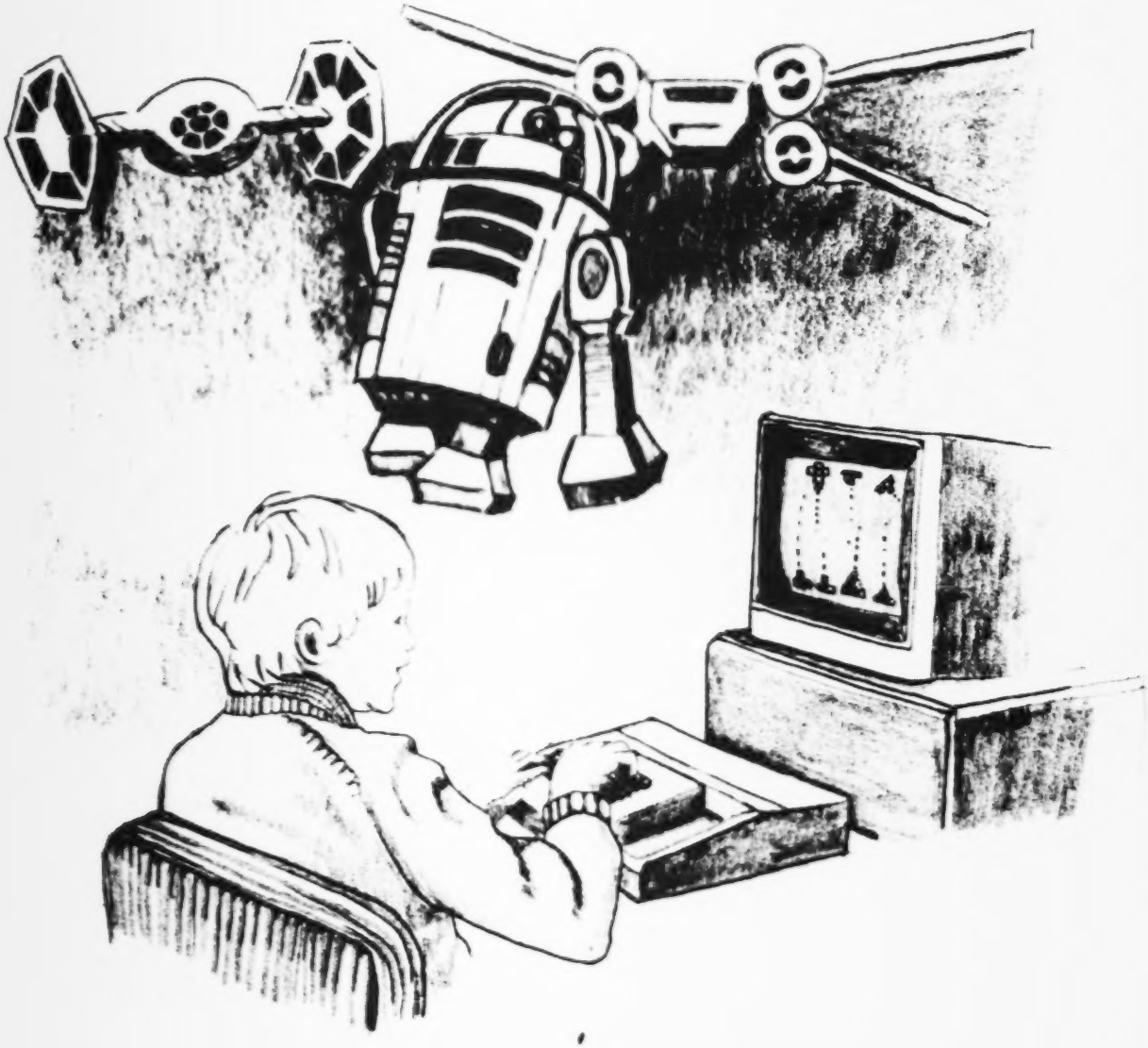
Technology education programs that truly represent a broad study of modern technological practices provides educational and social experiences to help all students benefit from the above functions. The enrichment of varied stimuli in technology education laboratory activities can have a positive affect on the educational achievement and tempermental style of special needs learners. To support students in developing their abilities to their fullest potential, technology education teachers should:

- Be understanding and show empathy.
- Reward all accomplishments orally and with material rewards when appropriate.
- Provide constant guidance and direction in developing acceptable behavioral patterns.
- Encourage students to accept failure but not be defeated.
- Have students work with others in stressful situations (under controlled conditions).
- Provide a variety of experiences to match the diverse needs of students.
- Be supportive, understanding, and willing to guide students' behaviors toward satisfying end goals.

As mentioned earlier, the technology education laboratory is unique because students have opportunities to use a variety of learning styles. It facilitates the development of cognitive skills and improved self-perception, and can aid in the personal/social development of exceptional learners.

If we do not tap the potential of exceptional learners, we fail to develop and utilize a substantial portion of our human resources. Our society's continued economic growth and national security depend upon the intellectual development and productivity of all citizens. Therefore, it is imperative that technology educators ensure that every special needs student is prepared with the skills necessary to make a meaningful contribution to society and self.

Some technology educators have been sensitive to the needs of special students and have accommodated their needs without difficulty. However, others have experienced problems in doing so, possibly because of a lack of information on teaching children with special needs and/or the absence of supportive services from other professional sectors. This guide should provide the appropriate information about learners with special needs and recommendations regarding instructional strategies that would serve to support technology education staff working with exceptional students.



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APPENDIX A

Resources

National Disseminating Centers and Professional Association

International Technology Education Association
1914 Association Drive
Reston, Virginia 22091

The Council For Exceptional Children
1920 Association Drive
Reston, Virginia 22091

The Educational Resources Information Clearinghouse on Handicapped and Gifted
Council for Exceptional Children
1920 Association Drive
Reston, Virginia 22091

National Association for Gifted Children
217 Gregory Drive
Hot Springs, Arkansas 71901

National Center for Educational Media and Materials for the Handicapped (NCEMMH)
Faculty for Exceptional Children
1945 North High Street
Columbus, Ohio 43210

National Instructional Center for Special Education Materials (NICSEM)
University of Southern California
University Park
Los Angeles, California 90007

Special Education Regional Resource Centers

A network of six special Education Regional Resource Centers was organized to locate and verify successful practices used in the education of handicapped students. Specifically, agencies provide assistance to determine proven methods of identifying and evaluating handicapped children according to federal and state legal requirements; program development in rural and urban areas; and other aspects of education for the handicapped, including placement in a least restrictive environment and individualized education program planning.

MID-SOUTH RRC
University of Kentucky
Research Foundation
Porter Building, Room 131
Lexington, Kentucky 40506

SOUTH ATLANTIC RRC
Florida Atlantic University
1230 North University Drive
Plantation, Florida 33322

N.E. RRC
Trinity College
Colchester Avenue
Burlington, Vermont 05401

MOUNTAIN PLAINS RRC
Utah State University
Exceptional Child Center
Logan, Utah 84322

WESTERN RRC
University of Oregon
College of Education
Eugene, Oregon 97403

GREAT LAKES AREA RRC
The Ohio State University
161 Rightmire Hall
1060 Carmack Road
Columbus, Ohio 43210

APPENDIX B

Technology Education Standards Relating to Special Needs

Among the 241 standards which appear in the document entitled *Standards for Technology Education Programs*, there are 19 which directly address students with special needs. These are listed below.

Philosophy

1.1 3(b) The philosophy identifies the needs, abilities and interests of all learners regardless of race, sex, creed, national origin, or handicapping conditions.

Instructional Program

2.2 3 Course objectives are utilized as a basis for developing the technology education component of the Individualized Education Program (IEP)

Student Populations Served

3.1 2 Students who are academically and/or economically disadvantaged are provided special services and assistance, as required, to enable them to succeed in the technology education program.

3.1 3 Students who have physical, mental, and/or emotional impairments are provided special services and assistance, as required, to enable them to succeed in the technology education program.

3.1 4 Students identified as handicapped and requiring additional or modified educational services or materials are enrolled only after the Individualized Education Program (IEP) has been prepared.

3.1 5 Students identified as gifted and/or talented are provided learning activities consistent with their abilities.

3.1 6 Technology education is provided for students, regardless of their cultural differences.

Instructional Staff

4.1 6 The technology education teacher is prepared, through preservice/inservice education, to provide experiences for students with special needs.

Administration and Supervision

5.1 5 Teacher aides or paraprofessionals are provided in classes where enrollment of students with special needs necessitates their assistance.

5.5 4(b) Demographic data about all technology education students are available by grade level and by course, including but not limited to course enrollments by racial and ethnic categories, by sex, and by type and number of students with special needs.

Support Systems

6.1 1(b) Personnel are available to assist the technology teacher in serving students with special needs.

6.2 6 Accessibility for the handicapped is ensured through the elimination of architectural barriers.

6.2 12 Specially designed or modified tools, machines, and equipment are provided for students with special needs.

6.2 16 Books and other instructional materials are provided to meet the unique requirements of students with special needs.

Instructional Strategies

7.1 6 Technology teachers provide input to the Individualized Education Program (IEP) committee for handicapped students in technology education.

7.2 1(h) Instructional strategies appropriate for serving students with special needs have been identified and incorporated in the technology education program.

7.2 3 Each identified handicapped student enrolled in technology education is evaluated annually through procedures and criteria described in the Individualized Education Program (IEP).

Safety and Health

9.2 2(g) Special safety and health accommodations are provided for students with special needs.

9.2 4(e) Specially adapted personal protection devices are available for and used by students with special needs.

The International Technology Education Association is the leading technology education (industrial arts) association. ITEA's first and only priority is to serve the technology educator with materials and programs for classroom use and professional development.

For more information about ITEA's programs or for membership information, please write: ITEA, 1914 Association Drive, Reston, Virginia 22091-1502; 703/860-2100.

INTERNATIONAL TECHNOLOGY EDUCATION ASSOCIATION
1914 ASSOCIATION DRIVE, RESTON, VA 22091-1502